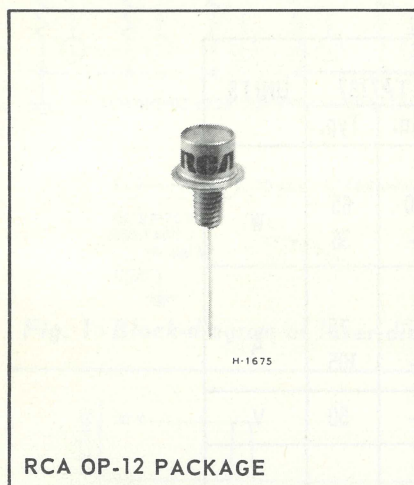




Gallium Arsenide Single-Diode Lasers "CC" (Close-confinement) Types

For Pulse Operation at Room Temperature

Features:

- New coaxial package provides —
simpler mounting
greater thermal dissipation capability
- High radiant peak output power —
40 W (min.) TA7705
60 W (min.) TA7787
- Source size — 55 X 0.08 mils

RCA development types TA7705 and TA7787 are gallium arsenide laser diodes which radiate in the near-infrared region (9050Å). These devices are fabricated by a new close-confinement process which limits the radiation to the junction region, resulting in lower threshold currents and greater efficiency.

The TA7705 and TA7787 lasers produce typical total radiant peak output power of 50 and 65 watts, respectively, at a peak wavelength of 9050 angstroms. The wavelength shifts slightly (8Å) during the pulse, and changes with temperature approximately $2.5 \text{ Å}/^\circ\text{C}$.

The laser output is emitted from an extremely small area, approximately 55 by 0.08 mils, or about $4.4 \times 10^{-6} \text{ in}^2$. As a result of these small dimensions, diffraction occurs to provide an emitted beam with half-angles at the

half-power points of 10° . With a simple lens, the beam angles can be reduced to a fraction of a degree.

The laser is operated by pulsing it in the forward-bias direction. At temperatures of 23°C and higher, the peak current must be limited to 250A; below 23°C , the maximum peak current is derated. At room temperature, the pulses must be less than 100 ns (measured at the half-current points). If the 100-ns duration is exceeded, the laser may stop lasing and may be damaged. The duty factor of the current pulse can not exceed 0.005% at room temperature, as the power dissipated at a greater pulse duration will decrease the output and may damage the laser. This duty factor will allow a 0.5 kHz repetition rate at maximum pulse duration and higher repetition rates for shorter pulses.

MAXIMUM RATINGS, Absolute-Maximum Values:

PEAK REVERSE VOLTAGE*	V_{RM}	2	V
PEAK FORWARD CURRENT:	I_{FM}		
At case temperature of 23°C and above		250	A
At case temperature below 23°C derate		1	A/ $^\circ\text{C}$
PEAK FORWARD CURRENT PULSE CONDITIONS: ■			
At case temperature of 23°C :			
Pulse duration		100	ns
Repetition rate (At maximum pulse duration)		0.5	kHz
Duty factor		0.005	%
TEMPERATURE RANGE:			
Storage		-196 to 85	$^\circ\text{C}$
Operating, Case (Maximum usable temperature is at $I_{th} = I_{FM}$)		-196 to 40	$^\circ\text{C}$

*Peak reverse voltage should never be exceeded.

■ Pulse duration can not be exceeded or laser will stop operating. Repetition rate can be increased if pulse duration is reduced. Exceeding duty factor will reduce output and may cause damage.

Developmental-type devices or materials are intended for engineering evaluation. The type designation and data are subject to change, unless otherwise arranged. No obligations are assumed for notice of change or future manufacture of these devices or materials.

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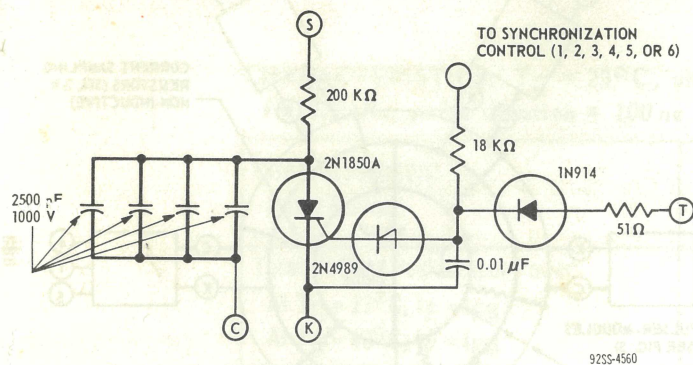


Fig. 5 - Pulser-module circuit for laser-diode test circuit

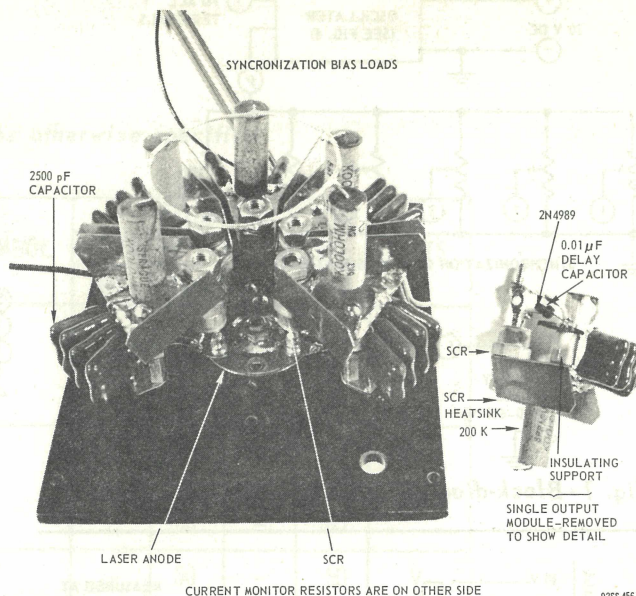
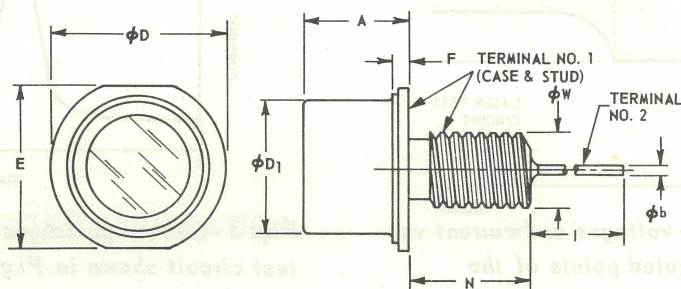


Fig. 6 - Suggested mounting arrangement of components for laser-diode test circuit

DIMENSIONAL OUTLINE RCA-OP-12



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	.255	.280	6.47	7.11	
ϕb	.018	.022	.45	.55	
ϕD	.425	.450	10.79	11.43	
ϕD1	.325	.335	8.25	8.50	
F	.390	.410	9.90	10.41	
I	.035	.050	.88	1.27	
N	.75	1.100	19.05	27.94	
ϕW	.285	.315	7.23	8.00	
	.1658	.1697	4.212	4.310	1,2,3

- NOTE 1: THE STUD SHALL BE OF SUCH DIMENSION THAT IT WILL ACCEPT A STANDARD 10-32 NUT.
- NOTE 2: COMPLETE THREADS ON STUD TO EXTEND WITHIN THREE THREADS OF HEAD.
- NOTE 3: PITCH DIAMETER-THREAD 10-32 UNF 2A (COATED). REFERENCE (SCREW THREAD STANDARDS FOR FEDERAL SERVICES-HANDBOOK H-28).

92SS-4562

TERMINAL CONNECTIONS

- Terminal No. 1 - Negative terminal (Case & Stud)
- Terminal No. 2 - Positive terminal, P_{IN} (Lead)